**Domain:** Geometry **Standard Code:** 2.G.1 **Teacher Name:** Cook–Bolton-Berezay

Adapted from: Smith, Margaret Schwan, Victoria Bill, and Elizabeth K. Hughes. “Thinking Through a Lesson Protocol: Successfully Implementing High-Level Tasks.”

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| **PART 1: SELECTING AND SETTING UP A MATHEMATICAL TASK** | |
| What are your mathematical goals for the lesson? (i.e., what do you want  students to know and understand about mathematics as a result of this lesson?) | * Reason with shapes and attributes * **Content Objective:** Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, and hexagons. * **Language Objective:** Students will describe their shapes using the words two-dimensional, side, edge, angle, face, triangle, quadrilateral, pentagon, hexagon |
| * What are your expectations for students as they work on and complete this task? * What resources or tools will students have to use in their work that will give them entry into, and help them reason through, the task? * How will the students work—   independently, in small groups, or in pairs—to explore this task?   * How will students record and report their work? | **Expectations:**   * Students will make sense of the problem and persevere in solving it * Students will create representations to show their reasoning by drawing and labeling * Students will work as a team to complete the task.   **Resources:**   * Construction paper * Scissors * Pattern Blocks * Glue * Crayons, colored pencils, markers   **Grouping:**  Students will work in groups of two  **Recording/Reporting:**  Poster and Math Journal |
| How will you introduce students to the activity so as to provide access to *all*  students while maintaining the cognitive demands of the task? | * Read the story The Greedy Triangle by Marilyn Burns * Hand out a hinged mirror and a piece of paper with a triangle already drawn on it |

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| **PART 2: SUPPORTING STUDENTS’ EXPLORATION OF THE TASK** | |
| As students work independently or in small groups, what questions will you ask to—   help a group get started or make progress on the task?   focus students’ thinking on the  key mathematical ideas in the task?   assess students’ understanding of  key mathematical ideas, problem- solving strategies, or the representations?   advance students’ understanding  of the mathematical ideas? | * What are you thinking? * Do you have a favorite shape in mind? * What supplies are you going to use when draw and label? * Does anyone in your group like the same shape? * Is anything missing? |
| How will you ensure that students remain engaged in the task?   What assistance will you give or what questions will you ask a  student (or group) who becomes  quickly frustrated and requests more direction and guidance is  solving the task?   What will you do if a student (or group) finishes the task almost  immediately? How will you  extend the task so as to provide additional challenge? | If students are stuck, assess where the frustration is, and refer back to above questions  **Extensions:**   * Students will make a Geo Art Project using construction paper shapes * Present what they made * Challenge the students to use the correct mathematical language while presenting |

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| **PART 3: SHARING AND DISCUSSING THE TASK** | |
| How will you orchestrate the class discussion so that you accomplish your mathematical goals?   Which solution paths do you want to have shared during the  class discussion? In what order will the solutions be presented? Why?   What specific questions will you ask so that students will—  1. make sense of the  mathematical ideas that you want them to learn?  2. expand on, debate, and question the solutions being shared?  3. make connections among the different strategies that are presented?  4. look for patterns?  5. begin to form generalizations?  What will you see or hear that lets you know that *all* students in the class  understand the mathematical ideas that  you intended for them to learn? | Teachers will observe students while working.  What do you want the students to share?   * Drawings * Reasoning * Geo Art Project (optional)   What order do you want the students to present?   * Students who finished the task * Students who made Geo Art as the extension activity   Discussion Questions:   * Which shapes has the most angles? * How does the number of angles compare to the number of size in shape? * How did decide where to start? * You told the class your favorite place…do you have any other places you would like to be as well?   How will you know students have achieved the learning outcome?   * Students will use the correct mathematical language when describing their drawings * Students will be engaged in the task * Students’ drawings will reflect their thinking |

Today you get to be the Shape shifter! Draw 3 or more 2-dimensional shapes that you could change the Greedy Triangle into. For each shape, identify the sides, angles, and vertices. What would be your favorite shape and where would you hang out if you were the Greedy Triangle?